Space Weather Forecast

Issued on Saturday, 11 February 2023 at 01:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares expected (R1/R2 Radio Blackouts)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with five Moderate flares (R1/Radio Blackouts). Most of the flares, including the largest, was from the sunspot region in the northwest, with the exception of an impulsive M1.3 from a smaller and simpler unipolar spot in the southeast in the southeast (southeast of the other main spot). The northwestern region is now a wide but simplifying region, with penumbra area decreasing and having lost some of its magnetic complexity, although ongoing evolution of its intermediate spots is apparent. The other main region in the southeast. Despite a lack of recent flares, and only a modest size, this has continued to show some growth and increasing magnetic complexity. In total there eleven numbered regions on the disc, although the other regions are generally small and/or simpler.

A CME (coronal mass ejection) was observed leaving the southwest quadrant of the Sun due to the eruption of a 'filament', which is a line of material held together by the Sun's magnetism. This CME has been assessed as likely missing Earth, but with a glancing interaction possible late on the 14th or 15th (days 4 or 5). A couple of other CMEs occurred, however these are off the Earth-Sun line.

Solar Wind / Geomagnetic Activity: Solar winds continued to be slightly elevated to elevated, perhaps due to weak glancing CME influences. Observed speeds rose from around 460 km/s to 500-550 km/s. The magnetic field strength was mainly weak, with the north-south component varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp 2-3), but with Active intervals (Kp 4) between 10/0000-10/0300 UTC and 10/2100-11/0000 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles is at Background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity expected with further Moderate flares expected and a slight chance of Strong flares. The main risk is from AR3217 and AR3213.

Solar Wind / Geomagnetic Activity: CMEs which left the Sun on the 7th and 10th, while forecast to miss the Earth, give a low chance of glancing interactions on days 1 and 4 (11th and 14th). Otherwise current slightly elevated solar winds are expected to erratically ease, with no other significant enhancements expected. Geomagnetic activity is expected to be mostly Quiet to Unsettled, with a decreasing chance of Active intervals. Any CME glance, however, has the potential to bring a more persistent Unsettled to Active spell, and a very slight chance of G1 Minor Storms day 1 and 4 (11th and 15th).

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to remain at background, but there is a very slight chance of this increasing towards the S1/Minor radiation storm level in response to any significant flares that occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	50
Very Active	R3 to R5 X	No	15	15	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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